

YOUTH UNEMPLOYMENT AND CRIME IN FRANCE

Denis Fougère
CNRS and CREST-INSEE

Julien Pouget
CREST-INSEE

Francis Kramarz
CREST-INSEE

Abstract

In this paper we examine the influence of unemployment on property crimes and on violent crimes in France for the period 1990 to 2000. This analysis is the first extensive study for this country. We construct a regional-level data set (for the 95 départements of metropolitan France) with measures of crimes as reported to the Ministry of Interior. To assess social conditions prevailing in the département in that year, we construct measures of the share of unemployed as well as other social, economic, and demographic variables using multiple waves of the French Labor Survey. We estimate a classic Becker-type model in which unemployment is a measure of how potential criminals fare in the legitimate job market. First, our estimates show that in the cross-section dimension, crime and unemployment are positively associated. Second, we find that increases in youth unemployment induce increases in crime. Using the predicted industrial structure to instrument unemployment, we show that this effect is causal for burglaries, thefts, and drug offenses. To combat crime, it appears thus that all strategies designed to combat youth unemployment should be examined. (JEL: J19, K42, J64, J65)

1. Introduction

In this paper we examine the influence of unemployment on property crimes as well as on violent crimes in France for the recent period (1990 to 2000). During this period, the unemployment rate first increased, then decreased. More precisely, between 1990 and 1997, labor market opportunities fell dramatically (the

The editor in charge of this paper was Orazio Attanasio.

Acknowledgments: We would like to thank Pierre Alquier (CREST-INSEE), Sylvie Dumartin (INSEE), François Poinat (INSEE), and Dominique Quarré (INSEE) for their help in the construction of the data used in this analysis. We would also like to thank the referees for very useful suggestions, Eric Gould for his constructive comments, as well as seminar participants at CREST, the NBER Summer Institute, the 18th annual EEA Congress, and the CEPR-IZA Summer Institute for helpful comments. Denis Fougère and Francis Kramarz are members of CEPR and IZA; Julien Pouget is a member of IZA.

E-mail addresses: Fougère: fougere@ensae.fr; Kramarz: kramarz@ensae.fr; Pouget: pouget@ensae.fr

unemployment rate rose from 8.9% to 12.5%). After 1997 the French economy started to recover. The crime pattern for the same period is completely different from that observed for unemployment. Indeed, during the 1990s, property crime rates first increased from 1990 to 1993, and then declined slowly. During the same period, violent crime rates kept increasing.¹ This paper is the first extensive study of this controversial issue in France. Using a variety of data sets, we examine the effects of changes in unemployment on crime. In particular, we compare the effects of changes in the share of unemployed among older individuals with those among younger ones (rather than their respective unemployment rates). In addition, we examine the impact of unemployment benefits on crime.

Most empirical research on the economics of crime aims at testing the Becker hypothesis that the propensity to commit crime depends on the comparison of the expected costs and benefits of legal and illegal activities (Becker 1968; Ehrlich 1996). Some researchers have focused on the costs side and evaluated the deterrent effects of apprehension and penalization (Ehrlich 1973; Levitt 1997; Imai and Krishna 2004). Others have examined the relation between labor market and crime, concentrating on measures of the potential benefits of legal opportunities (see the literature reviews by Freeman, 1983, 1994, 1996, 1999). Among them, some have assessed the effect of wages on crime rates. Using aggregate data, Gould, Weinberg, and Mustard (2002) for the U.S., and Machin and Meghir (2004) for the UK show that decreases in unskilled workers wages lead to increases in crime. Grogger (1998) estimates a structural model using individual-level data, and suggests that falling wages may be an important determinant of rising youth crime. Some have tried to relate income inequality and crime (Kelly 2000; Fajnzylber, Lederman, and Loayza 2002); these authors tend to show that more inequality is associated with higher crime rates.

On the contrary, the literature examining the links between crime and unemployment fails to reach any consensus. Most studies assume that the unemployment rate is a measure of how potential criminals fare in the legitimate job market. From the theoretical point of view this hypothesis seems, at first glance, reasonable. Indeed, according to Becker's economic theory of crime, unemployed people are deprived of legal income resources (except for unemployment benefits), and, thus, are more likely to derive some income from illegal activities. But

1. These divergent trends had major political implications in France in 2002: The increase of crime was the focus point of the 2002 presidential election campaign, and so contributed, in the first round, to the defeat of the socialist Prime Minister Lionel Jospin, by the far-right National Front leader Jean-Marie Le Pen. These—apparently—opposite trends led Lionel Jospin to confess, while running for the presidency, in March 2002: “*J'ai péché un peu par naïveté. Je me suis dit ...: si l'on fait reculer le chômage, on va faire reculer l'insécurité*” [*I was naive. I said to myself ...: if we make unemployment decrease, we will make insecurity decrease*].

empirical findings based on aggregate data suggest that this relationship is not particularly strong. According to Chiricos's review (1987), most studies of this type find a positive relationship between unemployment and crime rates, but this effect is not always significant, and some even find a negative association. For example, using panel data for Germany, Entorf and Spengler (2000) confirm the ambiguous result for total unemployment, even if they suggest that youth unemployment is associated with a higher probability of committing crimes. Studies based on individual-level data (such as Witte and Tauchen (1994), who use data from a cohort sample of young men) provide more convincing evidence that crime is linked to unemployment. Thornberry and Christenson (1984) investigate the causal structure between unemployment and crime rates. According to their results, unemployment has significant instantaneous effects on crime and crime has significant but lagged effects on unemployment. Cantor and Land (1985) try to identify two distinct (and potentially counterbalancing) mechanisms, criminal opportunity and criminal motivation, through which unemployment may affect crime rates in the aggregate.

In this paper, we estimate a classic Becker-type model and suggest some arguments explaining why most studies were not able to find a strong relation between crime and unemployment. To accomplish this task, we add several elements to the existing literature.

First, this paper is the first econometric analysis for France of this precise question (see, however, Roché (2001) for an extensive descriptive study of young criminals). We use both aggregate and individual-level data sets. We construct a unique département-level data set (there are 95 départements in France, approximately an American county) measuring crimes as reported to the Interior Ministry for the years 1990–2000. Second, because 17 crime categories are available, we are able to separate property crimes (which are more likely to fit the Becker's model of the rational offender) from violent crimes,² and to study precisely the temporal and geographic correlations between these categories.

Third, we are able to measure extremely precisely the social environment prevailing in départements. We construct a wealth of social, economic, and demographic variables at the département level. In particular, we use multiple waves of the French Labor Force Survey and, more interestingly, various administrative data sets such as national censuses, and administrative and fiscal sources. Then, these measures are matched to our crime statistics. For instance, we believe that our very precise measures of urbanization (such as city size or population density), of social interactions (such as the part of people living in single-parent families),

2. However, we should recognize that appealing to the classic Becker model of criminal behavior has been quite widely debated about whether the basic economic model of crime is or is not suited to studying crimes like violent crimes (see, for example, the discussion in Grogger's 2000 paper).

or of département income structure are relevant controls in order to study criminal behavior: for the United States, Glaeser, Sacerdote, and Scheinkman (1996) and Glaeser and Sacerdote (1999) found that social interactions mattered in their analysis of criminal behavior.

Fourth, as the effect of unemployment is often ambiguous, we divide the unemployed into various categories that should have different propensities to commit crime.³ Defining the most appropriate unemployment rate for crime participation has been recognized as a crucial point by criminologists for some time,⁴ although not much empirical work has tried to identify what the key subgroups are. Therefore, we construct several measures of youth unemployment as well as unemployment of older workers. In particular, we find that unemployment rates are not the best measure to approximate opportunity costs of the youngest age groups; shares of unemployed among a population of a given age provide “better” explanatory variables. We also measure unemployment duration as well as the fraction of unemployed who do not receive unemployment benefits. This variable, which in our case appears to alter significantly incentives to commit crime, was generally omitted in previous studies.

Other recent studies have documented the importance of looking at youth and youth-related policies. Lochner (2004) shows that property and violent crime rates typically increase with age during adolescence, reach a peak during the late teen-age years, and decline thereafter. His model is relevant for our paper as it predicts that older adults should commit fewer unskilled crimes and that looking separately at youths is an important way to identify the effect of market returns on certain types of crime. In related work, Lochner and Moretti (2004) estimate the effects of education on participation in criminal activity and find that schooling significantly reduces the probability of incarceration or arrest. Another recent paper lending support to the view that looking at youths is particularly relevant when evaluating crime policies is Fella and Gallipoli (2007), which finds that improving labor outcomes for youths is extremely effective in reducing crime rates. This paper replicates features of the “Quantum Opportunity Program” in the U.S. and finds strong support for education policies, as opposed to longer prison sentences. Finally, Cozzi (2005) exploits variation between black and white workers in the U.S. to account for differences in crime rates. He finds evidence that changes in employment risk account for part of the variation in crime rates.

3. In the companion discussion paper (Fougére, Kramarz, and Pouget 2006), we propose a simple choice model of crime activity in which potential offenders and potential victims belong to two distinct age-groups, with different propensities to commit crime. Such a theoretical model may justify our empirical strategy based on the distinction between adult and youth unemployment rates. Another theoretical argument justifying our approach has been provided by Poutvaara and Priks (2007).

4. See, for instance, studies by Sampson (1987) and Hale (1998).

Of course, because today's crime may well generate tomorrow's unemployment—if companies move away from crime-prone zones—unemployment is likely to be endogenous in our crime regressions. Therefore, we use the predicted rather than the observed industrial structure to instrument unemployment, an apparently consensual strategy (see Blanchard and Katz 1992) if such a thing was ever possible for any set of instruments. And, indeed, our results suggest that increases in youth unemployment cause increases in property crime, because education or work does not pay enough, in particular for the unskilled or low-educated youth.⁵

The paper is organized as follows. Section 2 describes the general trends in crime rates and unemployment in France. Section 3 presents the data and the basic model. Estimation methods and results are reported and discussed in Section 4. Section 5 concludes.

2. Trends in Crime Rates and Unemployment

The aggregate crime data used in this study are collected annually at the département level by the local police and gendarmerie authorities. There are 95 départements in France. Each has approximately the same geographical size but different populations. They roughly correspond to an American county. For historical reasons, the body in charge of ensuring security differs between urban areas, which are "police zones," and rural areas, which are "gendarmerie zones." Policemen's status is civilian but gendarmerie is a military corps. Both gendarmes and policemen have to record the number of reported crimes in their respective zones. Then, the Ministry of Interior gathers the data in each zone for each département and publishes the total number of offenses at the département level. So these data cover the entire French population. We restrict attention to the so-called "départements de France métropolitaine," excluding overseas territories, but including Corsica. Data are available for the years 1990–2000. Using département-level population data obtained from the French statistical institute (INSEE), we calculated crime rates, measured as offenses per 100,000 people.

For a crime to be included in these administrative data, it must be first reported to the police or the gendarmerie, who must then file an official report of the event. Offenses are reported for property crimes (armed or violent robberies, burglaries, car or motorbike thefts, thefts of objects from cars, shoplifting, pickpocketing, receiving stolen goods), for violent crimes (homicides, voluntary wounds, blackmails, threats, sex offenses, family offenses) and some other crimes (drug offenses,

5. In a recent paper, Bowles and Jayadev (2006) put emphasis on the labor-disciplining effect of unemployment, but they recognize that the consequences of unemployment extend well beyond this disciplining effect, especially because the unemployment rate influences directly social phenomena such as property crime.

damage to vehicle, illegal weapon ownership, violence against police). In the case of violent crimes, one crime is counted for each victim, whereas for property crimes one crime is reported for each event regardless of the number of victims (except for pickpocketing and shoplifting for which one crime is recorded for each victim). For the types of crimes we study, the classification remained unchanged since 1990.

Table 1 shows the levels and the geographical variability of crimes rates for each available type of offense in 1990 and 2000. Property crimes are the most numerous and vary a lot across départements (especially pickpocketing and violent robberies). On the other hand, violent crimes such as sex offenses or family offenses show little spatial variability.

Figures 1, 2, and 3 depict the trends in these crimes' rates for the period 1990–2000. Besides theoretical arguments that have been surveyed in our Introduction, the differences between these trends provide a further rationale for our choice to break up crime into precise categories instead of studying one aggregate index. Property crimes such as car thefts, thefts of objects from cars, shoplifting, or burglaries first increased from 1990 to 1993, and then declined slowly, in contrast

TABLE 1. Development of selected offenses in France (1990–2000).

Crime rate	1990			2000		
	Mean	Std-error	Coeff. of variation	Mean	Std-error	Coeff. of variation
<i>Property Crimes</i>						
Armed or violent robberies	107.5	100.4	0.93	186.8	193.0	1.03
Burglaries	712.5	384.9	0.54	656.5	232.6	0.35
Car thefts	519.9	343.7	0.66	515.1	290.0	0.56
Motorbike thefts	246.6	132.2	0.54	167.5	76.3	0.46
Thefts of objects from cars	1355.1	658.5	0.49	1140.7	450.1	0.39
Shoplifting	112.9	58.5	0.52	97.7	37.7	0.39
Pickpocketing	193.6	334.6	1.73	171.4	270.3	1.58
Receiving stolen goods	54.5	27.1	0.50	55.3	26.8	0.48
<i>Violent Crimes</i>						
Homicides, including attempts	4.5	2.4	0.54	3.7	2.0	0.54
Voluntary wounds	90.3	55.3	0.61	181.2	65.2	0.36
Blackmails, threats	55.2	16.4	0.30	82.7	35.1	0.42
Rape and other sex offenses	39.3	16.8	0.43	57.0	12.5	0.22
Family offenses, incl. violence against children	52.0	14.6	0.28	72.0	18.6	0.26
<i>Other Crimes</i>						
Drug offenses	99.9	76.7	0.77	176.2	64.1	0.36
Damage to vehicles	296.8	164.0	0.55	479.0	212.4	0.44
Illegal weapon ownership	26.6	14.8	0.55	37.3	24.1	0.65
Violence against police	39.4	12.7	0.32	66.6	33.8	0.51

Source: Ministry of Interior.

Note: Crimes rates are offenses per 100,000 people.

The département population means were used as weights (there are 95 départements in France).

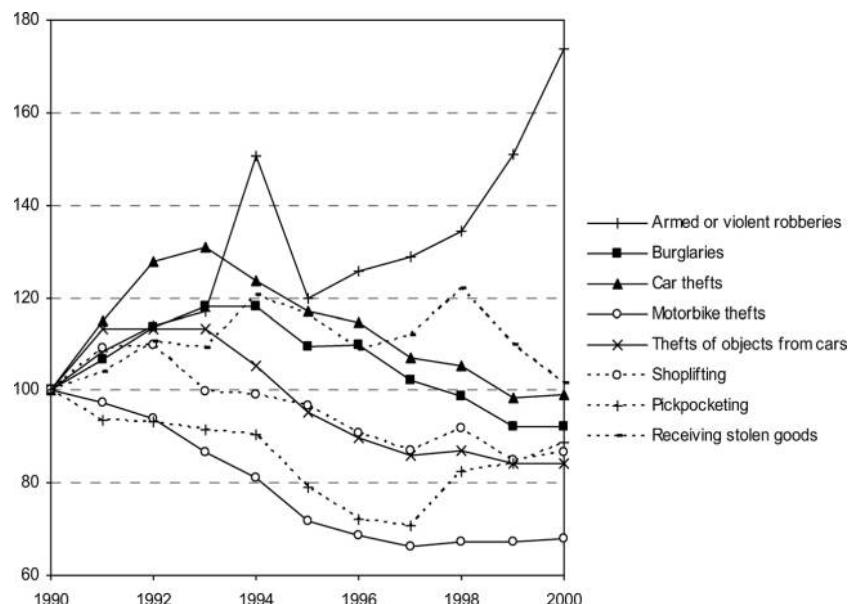


FIGURE 1. Property crimes' rates 1990–2000 (reference 1990 = 100).
Source: Ministry of Interior.

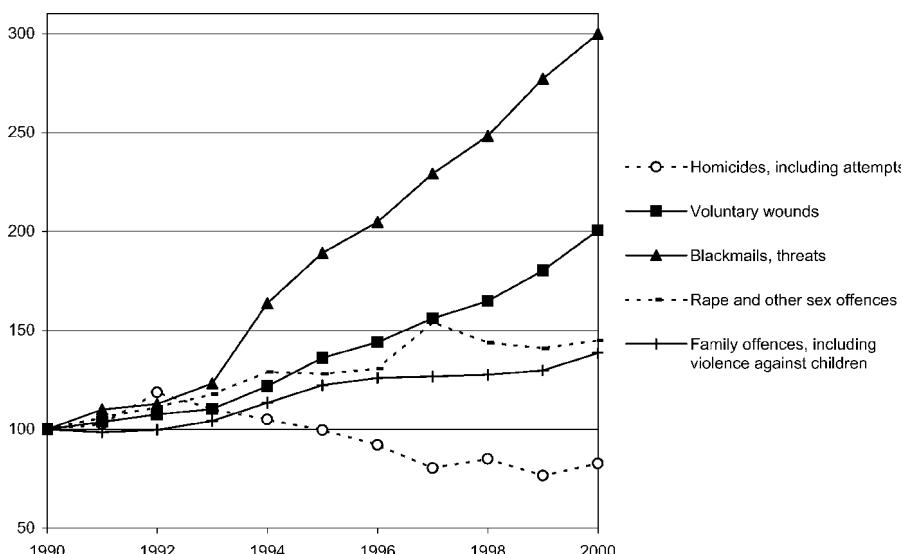


FIGURE 2. Violent crimes' rates 1990–2000 (reference 1990 = 100).
Source: Ministry of Interior.

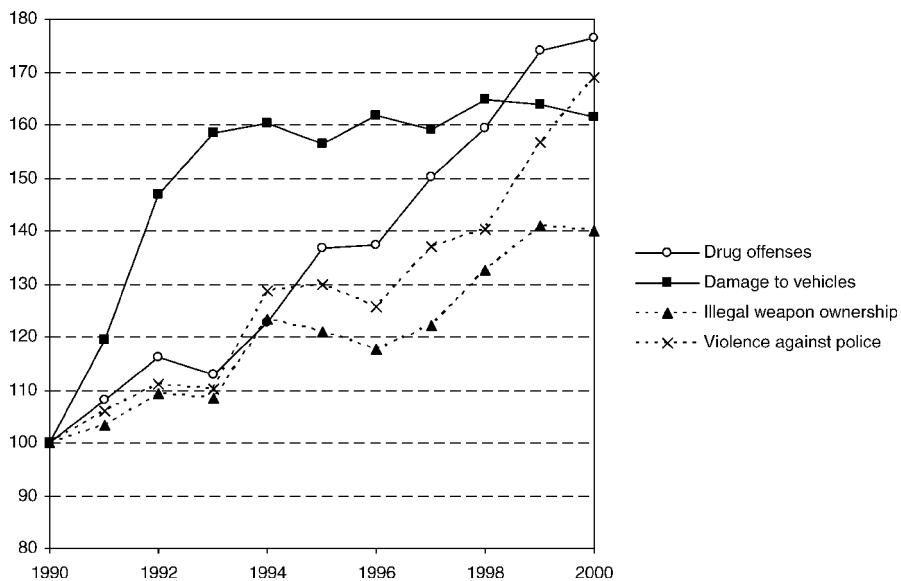


FIGURE 3. Other crimes' rates 1990–2000 (reference 1990 = 100).
Source: Ministry of Interior.

to what is often written in the French press. For example, burglaries declined by 8% between 1990 and 2000. Only armed or violent robberies increased dramatically (by 74%) during the same period. They follow the same pattern as violent crimes: except for homicides, all types of violent crimes (including damages to vehicles, illegal weapon ownership, and violence against police) increased during the last decade. Blackmails and threats tripled and the rate of voluntary wounds doubled. Even if they account for little in the total reported crimes, these violent crimes are the most likely to influence the feeling of insecurity, as discussed in the media.

These data are the most frequently cited measures of the extent of crime in France. They are also the most frequently criticized by the media as being contaminated by multiple biases. Indeed, their capacity to reflect real trends in crime rates depends on the reporting behavior of victims and the recording behavior of policemen and gendarmes.

Indeed, not all crimes are reported to the police and, unfortunately, administrative data only take into account reported crimes. Victimization surveys provide a better measure of the “true” number of crimes (reported or not to the police). Indeed, some studies show that different sources may exhibit different trends: For the U.S. Bogges and Bound (1993) found that administrative data from the Uniform Crime Report (UCR) suggested a mild increase in crime during the

1980s, whereas the National Crime Survey depicted lower criminal activity over this period. Such a victimization survey has been conducted by the French Statistical Institute (INSEE) for the years 1996 to 2002. Roughly 6,000 households and 11,000 individuals are interviewed every year. For each household, we have information on burglaries and car thefts. For each individual, the survey records information on thefts, personal attacks, as well as the feeling of insecurity. This survey also gives information on the reporting behavior for each incident (either to the police or to the gendarmerie), and, if not reported, the reason for non-reporting the event.

By construction, crime rates measured with victimization surveys are significantly higher than their counterpart in administrative data. Over the period 1996–2002, 3.0% of French households were victims of a burglary; 13.5% had their car or something in their car stolen. During the years 1997–2002, 8.5% of individuals (more than 15 years old) were wounded, insulted, or threatened whereas 4.8% were affected by pickpocketing.

The reporting rate (Figure 4) depends on the type of crime. Less serious crimes have a lower probability of being reported to the police than more serious crimes. According to the survey, the types of events most likely to be reported to the police are burglaries and vehicle thefts. In 2002, 80% of burglary victimizations and 64% of car thefts (or thefts of objects in car) were brought to the attention of the police. Indeed these events affect the most valuable possessions of the victims who are required to report it to obtain compensation from their insurance

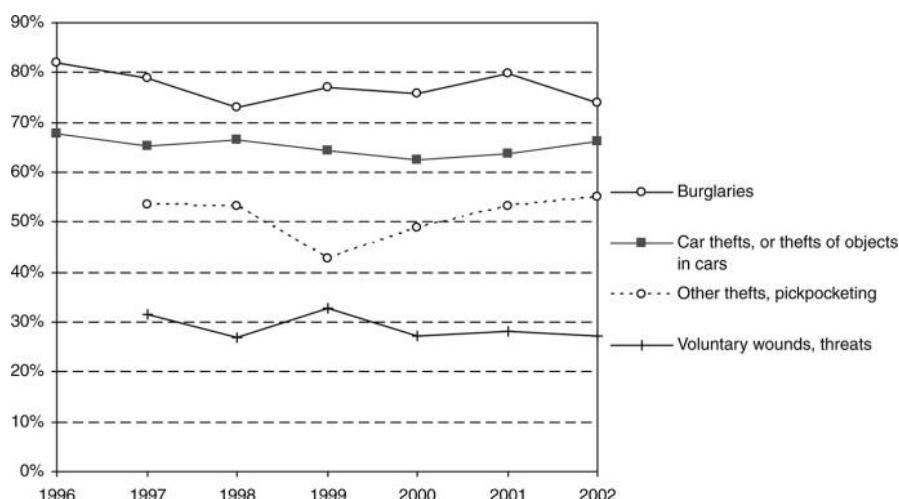


FIGURE 4. Reporting rate 1996–2002.

Source: Victimization surveys, INSEE, 1997–2002.

company. By contrast, in 2002, 53% of personal larcenies, and 29% of voluntary wounds, insults, and threats were reported to the police.

Administrative data are easier to use if reporting rates do not change over time. According to Figure 4, these rates remained stable over the period 1996–2002. And the trends in victimization rates (Figures 5 and 6) seem to fit the trends recorded in administrative sources, even though the categories in the two data sets are not exactly similar. According to the victimization surveys, burglaries and car thefts declined by 30% between 1996 and 2002, and larcenies increased by 40%.

Finally, Figure 7 reports changes in the unemployment rates by age categories during the 1990s. A noticeable fact is the high youth unemployment rate in France, compared to similar countries. During the years 1994–1997 it hits a peak (virtually 30% of the 15–24-year-olds in the labor force was unemployed). After 1998 it declined (20% in 2002). Unemployment rates for other age categories follow the same general trend but are considerably lower. Trends in crime rates and in unemployment rates obviously differ. As empirically most “economic” crimes (such as thefts) are committed by young adults, whereas homicides or sexual offenses are more likely to be committed by older delinquents (Figure 8), we will put special emphasis on the potential effect of youth unemployment on crime.

3. Data Set

In this study we construct a regional-level data set (for the 95 départements of metropolitan France) with measures of crimes as reported to the Ministry of Interior. We then match this data set with various socio-economic indicators. These indicators were constructed at the département level (to be matched to our panel).

First, to assess social conditions prevailing in the département that year, we constructed social, economic, and demographic variables using multiple waves of the French Labor Force Surveys. In March of every year the French Statistical Institute (INSEE) conducts a Labor Force Survey (*Enquête sur l'Emploi*), interviewing roughly 130,000 people who are asked a set of standard questions that are repeated every year. In particular, we know for each individual his or her département of residence. We use the Labor Force Survey for the years 1990 to 2000; most variables of interest are available every year. So for each département and year, we construct averages of the following variables: fraction of foreigners coming from North Africa, fraction of other foreigners, an age structure vector (fraction of 15–24-year-olds, of 25 to 49, above 50), a family vector (fractions of men living alone, of people living in single-parent families), an education vector (fractions of high school graduates, of high school dropouts), and a city structure vector (the share of persons living in rural areas, in cities with fewer than

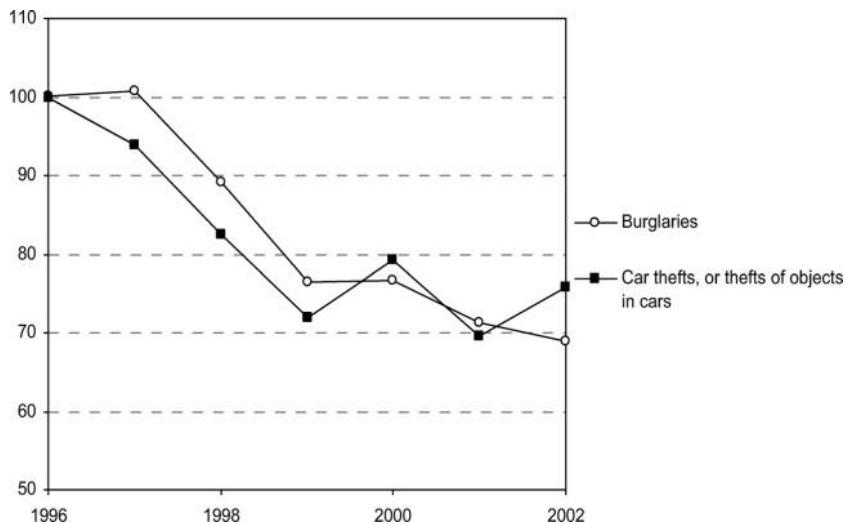


FIGURE 5. Victimization rate 1996–2002 (household level; reference 1996 = 100).

Source: Victimization surveys, INSEE, 1996–2002.

20,000 inhabitants, in cities between 20,000 and 200,000 inhabitants, in cities with more than 200,000 inhabitants, in Paris and suburbs). In addition, we use the industry structure at the département-level from 1986 to 2000 to construct predicted employment shares that will be used as instrumental variables (described

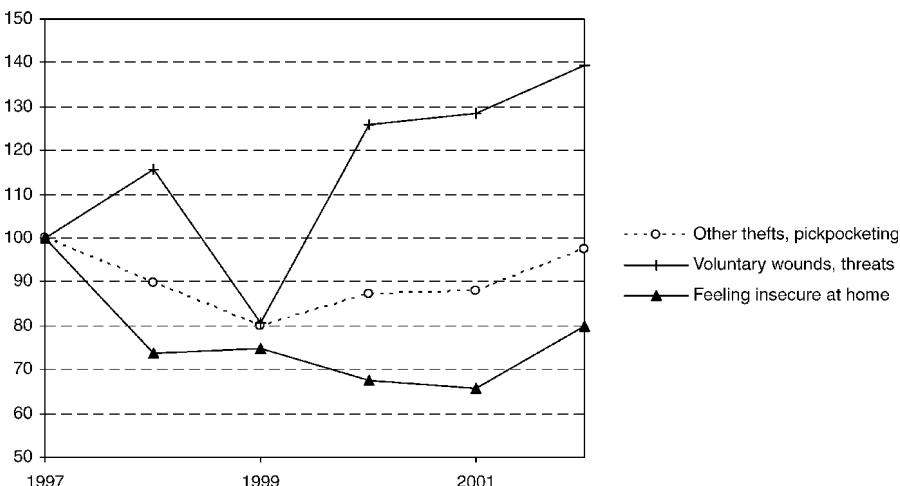


FIGURE 6. Victimization rate 1997–2002 (individual level, reference 1997 = 100).

Source: Victimization surveys, INSEE, 1997–2002.

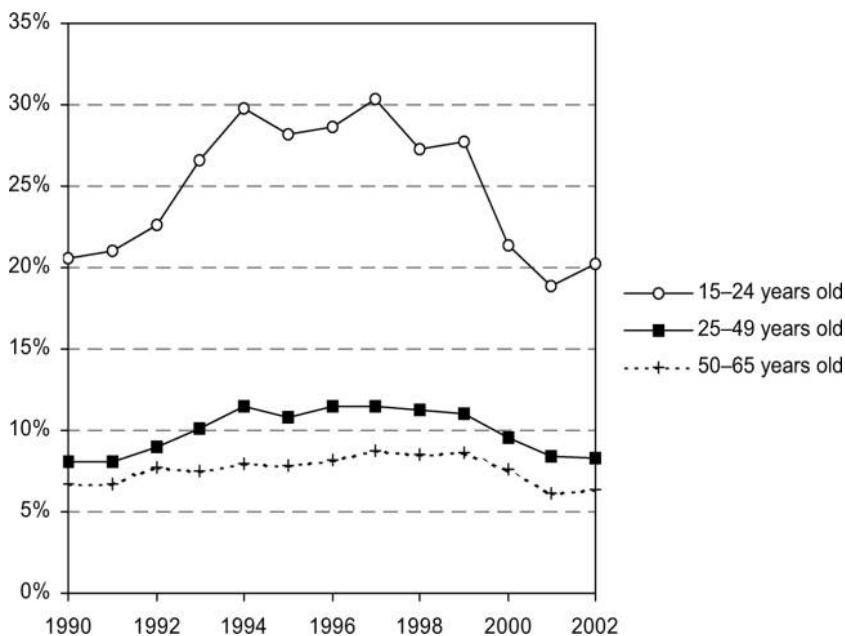


FIGURE 7. Unemployment rates (by age categories) 1990–2002.
Source: Labor Force Surveys (Enquête Emploi), INSEE, 1990–2002.

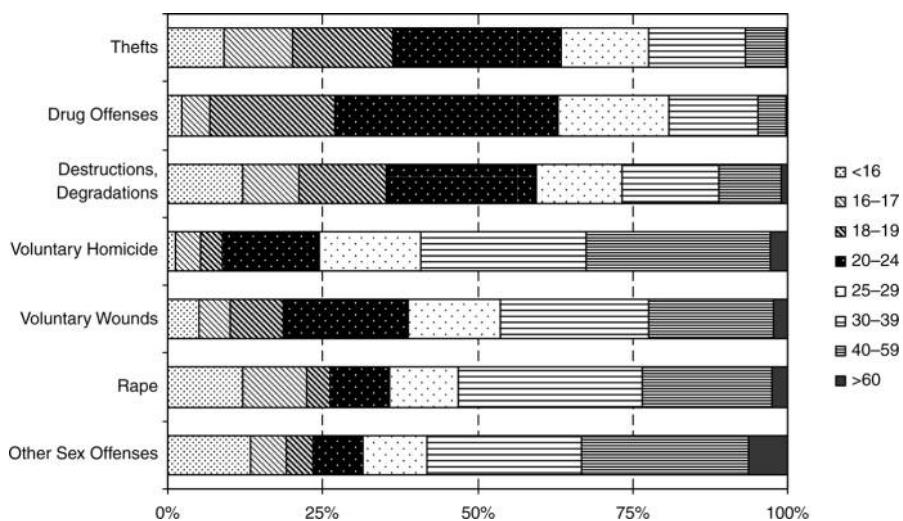


FIGURE 8. Shares of convicted delinquents (by age categories), 2000.
Source: Ministry of Justice.

subsequently). The number of policemen was obtained from INSEE, and the number of gendarmes was obtained from the Ministry of Defense.

We use the annual French Labor Force Survey and very precise administrative data from the French Public Employment Service⁶ to construct the share of unemployed people among the group 15 to 24 years old, rather than the unemployment rate, in each département. We consider the same measures (i.e., the fractions of unemployed people) among the 25- to 49-year-olds and among persons above 50.⁷ To calculate the share of unemployed among the young, we use numbers of students and of employed workers among the 15- to 24-year-olds reported by the French Labor Force Survey.⁸ We also use other administrative data sets available at the département-level. The French Public Employment Service provided us with département-level data sets with the share of unemployed above 25 years old not receiving unemployment benefits, and the number of long-term unemployed (unemployed for more than one year).

When looking at unemployment shares based on total population (rather than rates based on labor force) for young age groups we include large numbers of students in the denominator. Denote the unemployment share at age g as $UNS(g)$ and the unemployment rate at age g as $UNR(g)$:

$$UNS(g) = (\text{number unemployed of age } g) / [(\text{labor force of age } g) \\ + (\text{students of age } g) + (\text{others of age } g)],$$

$$UNR(g) = (\text{number unemployed of age } g) / (\text{labor force of age } g).$$

Then, especially for low g , we would expect that a good part of the denominator consists of people actively investing in human capital. These people are: (i) possibly different from all others in some unobserved dimensions (could be ability,

6. As unemployment is the core issue of our paper, we chose to measure it with very precise actual data, instead of using only the Labor Force Survey. When calculating the share of unemployed people among a given subpopulation, the numerator is the actual number of unemployed people, coming from administrative data provided to us by the French Public Employment Service, and the denominator is the total population in the subgroup, estimated from the French Labor Survey.

7. Moreover using unemployment rates, rather than shares of unemployed people, as regressors gives in general less clear-cut and statistically significant results.

8. The 15–24 age group mixes individuals who are studying with individuals having already completed undergraduate studies (those above 22). Unfortunately, the 15–24 age category is difficult to break down into more meaningful groups (for instance, below 18, between 18 and 22, between 23 and 25). Indeed, the French Public Employment Service does not provide the numbers of unemployed people within these disaggregated age categories, and the Labor Force Survey does not allow us to count with enough precision, in each French département, the numbers of young people who are less than 18 and who are not employed or in school. The same reasons explain why we do not look at unemployment for immigrant groups. However, we also conducted a statistical analysis by gender, but the results were more imprecise and difficult to interpret.

family background/permanent income, or discount rates); and (ii) accumulating human capital which will increase their future costs of participating in crime. This small measurement change may induce large effects in crime rate: *UNS* provides a better measure of the relative size of low types/low human capital/low returns in a given economy. Arguably this measure is much more effective than the *UNR* measure which, for young age groups, excludes all information about agents making active human capital investments. In the case of *UNR(g)*, an increase in students (which will reduce crime both immediately and over time) can be accompanied by a reduction in the total labor force, which pushes up the unemployment rate as measured by *UNR*; this, in turn, biases down the effect of *UNR* on crime. The same change, however, does not result in a reduction of *UNS*. In this sense, we provide a more reliable measure of the “low market returns” individuals and, hopefully, a better way to test Becker’s hypothesis for types of crime which are more recurrent among young people.

4. Empirical Findings

4.1. OLS Analysis

Most of our results at the local level of the département are based on variants of the following equation:

$$\ln(CR_{it}) = X_{it}\beta + \gamma U_{it} + \alpha_i + \delta_t + \varepsilon_{it}, \quad (1)$$

where CR denotes the crime rate in département i at date t , X denotes observed characteristics of the population, characteristics of the urban structure, and U denotes the share of unemployed in the population. Most of the time, we include time indicators and département fixed-effects. Finally, the last term of equation (1) is a statistical residual (white noise).

Table 2 presents the results for the basic specification. Each row shows results for a different crime. The first three columns present, respectively, the estimate for the unemployment coefficient, the standard error of this coefficient, and the R^2 of the regression without time and département indicators. The last three columns present the estimate for the unemployment coefficient, the standard error of this coefficient, and the R^2 of the regression with time and département indicators. All regressions include socio-demographic controls: fraction of foreigners coming from North Africa, of other foreigners, fraction of people aged 15 to 24, 25 to 49, of men living alone, of individuals in single-parent families, of individuals without any diploma, of high school graduates, of those living in rural areas, of those living in cities having between 20,000 and 200,000 inhabitants, of those living in cities with more than 200,000 inhabitants, and finally those living in Paris and its suburbs. Département populations are used as weights.

TABLE 2. OLS effects of unemployment on crime.

	No time or département fixed effects		Département and year fixed effects	
	Fraction of unemployed	Adjusted R^2	Fraction of unemployed	Adjusted R^2
Armed or violent robberies	12.22 (0.89)	0.83	-0.78 (1.22)	0.95
Burglaries	7.41 (0.60)	0.69	-1.76 (0.66)	0.94
Car thefts	14.80 (1.01)	0.69	-1.54 (0.94)	0.95
Motorbike thefts	3.56 (0.75)	0.50	-1.32 (0.73)	0.92
Thefts of objects from cars	6.42 (0.69)	0.65	-2.76 (0.86)	0.91
Shoplifting	-0.85 (0.93)	0.34	-0.52 (1.45)	0.73
Pickpocketing	7.79 (1.41)	0.75	-0.03 (1.40)	0.96
Receiving stolen goods	6.91 (0.84)	0.52	-2.37 (1.64)	0.70
Homicides, including attempts	4.25 (1.03)	0.42	2.90 (1.98)	0.64
Voluntary wounds	4.17 (0.80)	0.52	0.30 (0.95)	0.64
Blackmails, threats	3.70 (0.87)	0.36	2.92 (1.32)	0.75
Rape and other sex offenses	5.66 (0.66)	0.32	-0.65 (1.09)	0.69
Family offenses, including violence against children	3.56 (0.59)	0.44	-0.37 (0.73)	0.86
Drug offenses	2.64 (1.12)	0.39	-3.48 (1.68)	0.77
Damage to vehicles	10.00 (0.88)	0.65	-2.76 (1.36)	0.86
Illegal weapon ownership	3.09 (0.93)	0.54	5.41 (1.54)	0.79
Violence against police	1.99 (0.67)	0.57	2.49 (0.95)	0.86

Notes: Each row presents the results of two regressions. The only reported coefficient is that of the unemployment variable. The first regression does not include time and département effects. The standard errors are in parentheses. Each observation is a département-year, 1,045 observations. The dependent variable is the logarithm of offenses rates (offenses per 100,000 people). Each regression also includes socio-demographic controls (fraction of foreigners coming from North Africa, of other foreigners, fraction of 15–24, of 25–49, of men living alone, of people in single-parent families, of unskilled people, of high school graduates, of those living in rural areas, of those living in cities of a population between 20,000 and 200,000, in cities above 200,000, in Paris and suburbs). Département population is used as weight.

First, considering the R^2 column for the first set of regressions, two facts emerge. As predicted by Becker's rational model of crime, property crime is better explained than violent crime or family crime (see Kelly (2000) for a similar observation). Second, all R^2 are very large, even without the département or time indicators. A simple comparison with wage regressions, where R^2 are lower than 0.3 in the cross-section and, therefore, observed characteristics appear to be less important than unobserved ones in wage analysis, shows that observable characteristics of the regions matter for crime. Third, in the cross-section, unemployment is positively associated with crime. Fourth, and in contrast to the third point, unemployment appears to be negatively associated with some property or, more generally, economic crimes (burglaries, most thefts, or drug offenses) in the panel dimension.⁹ On the other hand, some vio-

9. However, most of the estimated coefficients of unemployment effects are not statistically significant.

lent crimes (threats, violence against police forces) are positively associated with unemployment.

The following tables are mere variations on this theme. Table 3 has the same structure as Table 2 but contrasts unemployment by age categories. Focusing on the estimates with département fixed effects, we see that youth unemployment is positively associated with most crimes whereas unemployment for the two other age categories has a negative association with most crimes. This set of results is much more in agreement with the popular view of crime, but also with a simple choice model of crime activity. Indeed, those categories of crime for which the coefficient on youth unemployment is negative or not significantly different from zero—car thefts, homicides, pickpocketing, shoplifting, blackmail, rape, family offenses—are clearly not youth-specific in contrast to, say, drug offenses, motorbike thefts, or burglaries.

Table 4 goes a step further and tries to identify the effects of unemployment benefits on crime. The structure of the table is the following. Each row presents the results of two regressions. First, to the unemployment structure by age, we add the fraction of workers above 25 who are unemployed and do not receive unemployment benefits (specification (1)). Second, to the unemployment structure by age, we add the fraction of workers above 25 who are long-term unemployed (specification (2)). For this second regression, we only report the coefficient on the long-term unemployed variable since all other coefficients are virtually identical to those reported for specification (1). Results show that not receiving Unemployment Insurance (UI) benefits appears to be positively associated with some economic crimes (for instance, burglaries, thefts of objects from cars) and only those. These results stand in contrast to those of specification (2) because there is no association between crime and long-term unemployment.

Some institutional details are in order. First, most young workers are not eligible for unemployment benefits. Second, a non-negligible fraction of workers above 25 are not eligible for unemployment benefits, for instance because they did not work enough hours in the preceding year or because they were previously self-employed. Third, a large fraction of the long-term unemployed receive UI benefits. In conclusion, the positive coefficients on youth unemployment and on non-reception of benefits for workers above 25 are the two faces of the same coin. Reception of benefits appears to decrease the incentives to commit economic crimes, conditional of course on unemployment.¹⁰

In Appendix A, we test the robustness of these results by including a measure of the median wage and a measure of inequality (Q3/Q1 of the wage distribution)

10. The most recent reforms concerning the French UI system were launched in 1992 and 2001, those years being close to the first and last years of our panel data set (1990–2000). Thus it is impossible to use these reforms as exogenous variations for identifying more precisely the causal effect of the reception of UI benefits on crime.

TABLE 3. OLS effects of unemployment (by age categories) on crime.

	No time or département fixed effects			Département and year fixed effects		
	Fraction of unemployed among 15-24-year-olds	Fraction of unemployed among 25-49-year-olds	Adjusted R ²	Fraction of unemployed among 15-24-year-olds	Fraction of unemployed among 25-49-year-olds	Adjusted R ²
Armed or violent robberies	-3.54 (1.02)	8.63 (0.66)	0.84 (0.73)	4.13 (1.12)	5.27 (0.59)	0.95 (0.78)
Burglaries	-5.02 (1.11)	7.76 (1.22)	0.72 (0.69)	2.63 (1.05)	-1.88 (0.85)	0.94 (1.12)
Car thefts	-7.68 (0.83)	13.59 (0.91)	0.69 (0.56)	3.33 (0.65)	-1.83 (0.78)	0.95 (0.86)
Motorbike thefts	-4.32 (0.77)	2.00 (0.85)	0.56 (0.68)	2.50 (1.35)	-2.96 (1.33)	0.92 (1.03)
Thefts of objects from cars	-4.70 (1.08)	6.34 (1.19)	0.35 (0.35)	-0.55 (1.33)	0.91 (1.75)	0.91 (1.75)
Shoplifting	4.98 (1.56)	-5.89 (1.71)	0.78 (1.15)	1.15 (1.29)	-0.40 (1.69)	0.73 (1.69)
Pickpocketing	-8.49 (0.97)	5.57 (1.06)	0.55 (0.55)	4.94 (1.49)	-7.38 (1.49)	0.96 (1.96)
Receiving stolen goods	-5.57 (1.16)	8.20 (1.27)	0.48 (1.03)	-1.76 (1.81)	1.61 (0.86)	0.70 (2.39)
Homicides, including attempts	-7.57 (0.94)	5.86 (1.03)	0.51 (1.21)	1.78 (1.21)	-2.57 (1.21)	0.64 (1.14)
Voluntary wounds	1.47 (1.02)	0.97 (1.12)	0.37 (0.34)	1.21 (0.98)	0.79 (0.74)	0.89 (1.29)
Blackmails, threats	-2.13 (0.76)	5.24 (0.84)	0.34 (0.34)	-1.39 (0.98)	4.74 (0.88)	0.75 (0.70)
Rape and other sex offenses	1.87 (0.69)	3.71 (0.76)	0.45 (0.76)	-0.77 (0.67)	1.37 (0.88)	0.70 (0.86)
Family offenses, incl. violence against children	-0.60 (0.69)	3.44 (0.76)				
Drug offenses	-0.82 (1.30)	5.63 (1.03)	0.41 (1.43)	6.64 (1.05)	-5.01 (1.25)	0.78 (1.64)
Damage to vehicles	-1.04 (1.09)	7.72 (1.19)	0.66 (0.55)	1.05 (1.41)	-1.48 (1.41)	0.86 (1.86)
Illegal weapon ownership	-3.02 (0.78)	3.44 (0.86)	0.55 (0.58)	0.86 (0.85)	-1.53 (0.69)	0.79 (1.12)
Violence against police	-0.58 (0.78)	-0.21 (0.86)		-3.27 (0.85)	0.69 (0.69)	0.86 (1.12)

Notes: The standard errors are in parentheses. Each observation is a département-year. Observations are for the 95 French départements and for the years 1990-2000 (1,045 obs.). Dependent variables are the logarithms of offenses rates (offenses 100,000 people). Each regression also includes socio-demographic controls (fraction of foreigners coming from North Africa, of other foreigners, fraction of 15-24, of 25-49, of unemployed among those 50 and above, of men living alone, of people in single-parent families, of unskilled people, of high school graduates, of those living in rural areas, of those living in cities with a population between 20,000 and 200,000, in cities above 200,000, in Paris and suburbs). Département population is used as weight.

Sources: Ministry of Interior, ANPE, and INSEE (Labor Force Survey, 1990-2000).

TABLE 4. OLS effects of unemployment and unemployment benefits on crime.

	Specification (1)			Specification (2)		
	Fraction of unemployed among 15-24-year-olds	Fraction of unemployed among 25-49-year-olds	Fraction among unemployed above 25 not receiving UI	Fraction among unemployed above 25 with duration >1 yr	Fraction among unemployed above 25 with duration >1 yr	Fraction among unemployed above 25 with duration >1 yr
Armed or violent robberies	4.05 (1.11)	-5.16 (1.46)	0.14 (0.11)	0.07 (0.10)		
Burglaries	2.55 (0.59)	-1.77 (0.78)	0.14 (0.06)	-0.14 (0.05)		
Car thefts	0.99 (0.85)	0.49 (1.12)	0.10 (0.08)	-0.15 (0.08)		
Motorbike thefts	3.31 (0.65)	-1.81 (0.86)	0.03 (0.06)	-0.12 (0.06)		
Thefts of objects from cars	2.41 (0.78)	-2.83 (1.03)	0.16 (0.08)	-0.20 (0.07)		
Shoplifting	-0.45 (1.33)	0.77 (1.76)	-0.17 (0.13)	0.11 (0.12)		
Pickpocketing	1.05 (1.29)	-0.25 (1.69)	0.18 (0.12)	-0.02 (0.11)		
Receiving stolen goods	5.03 (1.49)	-7.50 (1.97)	-0.16 (0.14)	0.18 (0.13)		
Homicides, including attempts	-2.02 (1.81)	1.99 (2.38)	0.47 (0.17)	0.30 (0.16)		
Voluntary wounds	1.81 (0.87)	-2.62 (1.14)	-0.06 (0.08)	0.10 (0.08)		
Blackmails, threats	1.35 (1.21)	0.59 (1.60)	-0.25 (0.12)	0.10 (0.11)		
Rape and other sex offenses	-1.48 (0.98)	4.87 (1.30)	0.16 (0.09)	-0.13 (0.09)		
Family offenses, incl. violence against children	-0.76 (0.67)	1.36 (0.88)	-0.01 (0.06)	-0.04 (0.06)		
Drug offenses	6.71 (1.52)	-5.12 (2.00)	-0.13 (0.15)	-0.21 (0.13)		
Damage to vehicles	1.03 (1.25)	-1.44 (1.65)	0.05 (0.12)	0.03 (0.11)		
Illegal weapon ownership	0.87 (1.41)	-1.53 (1.86)	-0.01 (0.14)	-0.04 (0.13)		
Violence against police	-3.22 (0.86)	0.63 (1.13)	-0.08 (0.08)	0.20 (0.08)		

Notes: The standard errors are in parentheses. Each observation is a département-year. Observations are for the 95 French départements and for the years 1990-2000 (1,045 obs.). Dependent variables are the logarithms of offenses rates (offenses 100,000 people). Each regression also includes year and département fixed effects, socio-demographic controls (fraction of foreigners coming from North Africa, of other foreigners, fraction of those 15-24, of 25-49), of unemployed among those 50 and above, of men living alone, of people in single-parent families, of unskilled people, of high school graduates, of those living in rural areas, of those living in cities of a population between 20,000 and 200,000, in cities above 200,000, in Paris and suburbs). Département population is used as weight. Specification (1) includes the first three variables for each regression. Specification (2) is the same as (1) but replaces the fraction among those unemployed above 25 not receiving UI with the fraction of those with unemployment duration greater than 1 year.

Sources: Ministry of Interior, ANPE, and INSEE (Labor Force Survey, 1990-2000).

in the département (Table A1)¹¹ and the number of policemen and of gendarmes (Table A2). In addition to confirming the robustness of our previous results, estimates presented in Table A1 show that there is no relation between wages and economic crime (even though there is some evidence that sex offenses tend to happen in poorer areas). Furthermore, there is no relation between wage inequality and economic crime.¹²

Results shown in Table A2 are once again similar to those presented in the previous tables. The presence of police is negatively associated with robberies, burglaries, and thefts.¹³ By contrast, the effect of gendarmes is less clear-cut.¹⁴

4.2. A Causal Approach

Up to this point, we adopted a descriptive viewpoint. But, to go a step further, we have to use a causal approach. The basic problem is the following. Unemployment can be endogenous in a crime regression. Gould, Weinberg, and Mustard (2002) present the reason very clearly. If crime in a region induces firms to stop investing or even to start relocating their activities to less crime-prone regions, then unemployment and crime will be positively correlated because crime causes unemployment.¹⁵ The strategy that is usually applied, the instrumental variables technique, will also be adopted and described in the following paragraphs.

11. In a further regression which is not reproduced here (but available from the authors), we have entered separately the values of the quantiles Q1 and Q3, but their associated coefficients fail to be statistically significant. This means that crime seems to be more affected by (relative) inequality than by the (absolute) levels of poverty and wealth at the local level.

12. In unreported results, inspired by Gould, Weinberg, and Mustard (2002), we estimated similar regressions with the fraction of low-wage workers (among the young and the unskilled) as explanatory variables. None of these variables proved to be significantly different from zero.

13. The numbers of policemen and gendarmes are potentially endogenous, but treating this endogeneity jointly with the endogeneity of unemployment would have been difficult.

14. We were able to check some of these results at the city-level and the individual level. The French Ministry of Defense provided us with an aggregate crime rate (restricted to burglaries, robberies, larcenies, and thefts) at the city-level (covering 90% of the 36,000 French cities, belonging mostly to rural and semi-urban areas, where gendarmes are in charge of security). We matched this data set with various socio-economic indicators. Most of these results have the same flavor as those shown previously for the département-level analysis, in the cross-section dimension. In particular, when looking at the unemployment variables, youth unemployment seems to have a negative impact on crime. We also performed a similar analysis—with similar results—at the individual level, using our victimization survey matched with various socio-economic indicators.

15. This point has been recognized earlier in the crime literature. For instance, Cullen and Levitt (1996) argued that high-income individuals or employers leave areas with higher or increasing crime rates. Willis (1997) indicated that low-wage employers in the service sector are more likely to relocate due to increasing crime rates.

Our set of instruments is directly inspired by Gould, Weinberg, and Mustard (2002).¹⁶ However, we adapt their ideas to the French context. Gould, Weinberg, and Mustard justify their instruments, in particular the within-industry growth rates of employment shares in different skill groups, by appealing to skill-biased technical change (SBTC, hereafter). Hence, in their paper, these authors use the predicted industrial structure to instrument unemployment by skills; such predictions, made at the beginning of the period, are based on purely economic reasons and are, by construction, uncorrelated with crime. Because the forces of SBTC are pervasive in their period and country of study, these variables are indeed excellent predictors of unemployment for the different skill groups. However, evidence tends to show that technical change is much less biased in France than in the United States (see Goux and Maurin (2000) and Card, Kramarz, and Lemieux (1999)). By contrast, over the 1980s and 1990s, France was affected by two overwhelming forces: a clear shift from manufacturing to services¹⁷ and a strong increase in university education.¹⁸ Between 1990 and 2001, manufacturing employment decreased by 10%, and employment in services increased by 25.4%. The number of students enrolled in universities increased by 25.8% during the same period. Hence, the exact instruments that Gould, Weinberg, and Mustard (2002) used must be adapted to fit the French situation.

To give an intuition of the way such instruments should work, let us consider some service industry with strongly growing national employment and some manufacturing industry with declining national employment. Now, the Paris département will clearly benefit from the former trend when the Nord département, with a strong manufacturing base, will be adversely affected by the latter. This service industry will increasingly demand young or educated workers whereas the age composition in the manufacturing industry should be gearing towards older workers. Similarly women, often more educated than men, have entered the service sectors en masse. To be valid, instruments derived from these principles should be correlated with changes in the age structure of unemployment and exogenous to crime. We describe how they are constructed in the following paragraphs.

First, in line with Gould, Weinberg, and Mustard (2002) and the previous discussion, we use the initial industrial composition in each département which is clearly exogenous to changes in crime rates. Similarly, the national (rather than the département-level) industrial composition trends in employment in each

16. See also Blanchard and Katz (1992).

17. See www.insee.fr/fr/ffc/figure/NATnon03146.XLS for precise numbers.

18. See media.education.gouv.fr/file/42/1/2421.pdf.) These movements have taken place earlier in the United States and could not be used by Gould, Weinberg, and Mustard (2002).

industry are exogenous to the same changes in crime rates and reflect the massive changes observed in France over the nineties. Finally, the changes in the “demographic” (age, sex) and education composition within each industry, again at the national level, admittedly share the same property. However, it is empirically difficult to use these three demographic factors simultaneously, because of limited sample sizes at the département-level. Hence, we construct two sets of instruments, one based on age (three groups), a second based on education and sex.

Therefore, we use as instrumental variables the components of the (predicted) change in demographic group g ’s share of employment between date 0 and date t ($t = 1, \dots, T$) in département d . Our first set of instruments uses three demographic groups, g , based on age (15–24, 25–49, and more than 50 years old). Our second set of instruments uses four demographic groups based on sex and education (two groups: below the baccalauréat and baccalauréat and above, to reflect university expansion). The change in demographic group g ’s share of employment between date 0 and date t in département d can be decomposed as follows:

$$f_{g|dt} - f_{g|d0} = \sum_i f_{g|d0i} (f_{i|dt} - f_{i|d0}) + \sum_i f_{i|dt} (f_{g|dti} - f_{g|d0i}), \quad (2)$$

where

- $f_{g|dti}$ (respectively, $f_{g|d0i}$) denotes the demographic group g ’s share of the employment in industry i at time t (respectively, at time 0) in département d ,
- $f_{g|dt}$ (respectively, $f_{g|d0}$) denotes the demographic group g ’s share of the employment at time t (respectively, at time 0) in département d ,
- $f_{i|dt}$ (respectively, $f_{i|d0}$) denotes industry i ’s share of the employment at time t (respectively, at time 0) in département d .

The first term on the right-hand side of equation (2), called $GROW_g$, represents the effect of industry growth rates, and the second term, called $DEMO_g$, reflects the effect of the demographic groups’ growth rates. Following Gould, Weinberg, and Mustard (2002), in estimating each term, we replace the département-specific employment shares $f_{g|dti}$ and $f_{g|d0i}$ with national employment shares $f_{g|ti}$ and $f_{g|0i}$. We also replace the actual end of period shares $f_{i|dt}$ with estimates $\hat{f}_{i|dt}$, using national measures and initial département-level shares

$$\hat{f}_{i|dt} = f_{i|d0} \frac{f_{i|t}}{f_{i|0}}.$$

Our sets of instruments include the predicted effects of industry growth rates $GROW_g$ and their squares. However, because $\sum_g GROW_g = 0$, one element in the vector of instruments $GROW_g$ has to be excluded from the list of regressors

TABLE 5A. Instrumenting regressions (instruments: predicted employment growth, by age and département).

	Fraction of unemployed among 15–24-year-olds		Fraction of unemployed among 25–49-year-olds	
$GROW_{15-24}$	−1.94	(1.26)	2.53	(1.06)
$GROW_{25-49}$	0.23	(0.17)	−0.40	(0.14)
$(GROW_{15-24})^2$	−189.73	(65.68)	−205.63	(55.38)
$(GROW_{25-49})^2$	4.47	(1.63)	3.94	(1.37)
Adjusted R^2		0.94		0.95
F and p -value	17.29	<0.0001	13.52	<0.0001

Notes: The standard errors are in parentheses. Each observation is a département-year. Observations are for the 95 French départements and for the years 1990–2000 (1,045 obs.). We construct the predicted employment growth rates in industries and within-industry growth of different demographic groups as described in Section 4.2. Each regression also includes socio-demographic controls (fraction of foreigners coming from North Africa, of other foreigners, fraction of those 15–24, of 25–49, of >50, of men living alone, of people in single-parent families, of unskilled people, of high school graduates, of those living in rural areas, of those living in cities with a population of between 20,000 and 200,000, in cities above 200,000, in Paris and suburbs), and time and département effects. Département population is used as weight.

Sources: Ministry of Interior, ANPE, INSEE (Labor Force Survey, 1990–2000).

in the instrumental regression. Values of these instruments are obtained from the French annual Labor Force Surveys collected by INSEE between 1989 ($t = 0$) and 2000 ($t = T$).

In practice, we use the following instruments:

- four instruments based on age: $GROW_{15-24}$, $GROW_{25-49}$ and their squares;
- four instruments based on sex and education: $GROW_{low-educ \text{ males}}$, $GROW_{low-educ \text{ females}}$, and their squares (the high-education male instrument appears to have insufficient power).

Results of these auxiliary regressions for our two sets of instruments are presented in Tables 5A and 5B.¹⁹ All our measures of unemployment are well correlated with the instruments (see the F -statistics). However, unreported results (available from the authors) show that the demographic growth rates (the $DEMO$ variables) do not appear to have good predictive power, in contrast with the industry growth rates (the $GROW$ variables). Hence, we did not use them. This is in line with our previous discussion: The movement in industry composition towards services and away from manufacturing has been strong. This movement has affected the age-unemployment movements. Furthermore, the demographic changes by themselves (i.e., without their interaction with industry evolutions)

19. The results of the first step of the IV procedure are reported for a quadratic specification. The specification without the quadratic terms is not reproduced here because it is rejected by the Sargan test.

TABLE 5B. Instrumenting regressions (instruments: predicted employment growth, by education, sex, and département).

	Fraction of unemployed among 15–24-year-olds		Fraction of unemployed among 25–49-year-olds	
$GROW_{\text{low-education males}}$	−0.18	(0.13)	−0.22	(0.11)
$GROW_{\text{low-education females}}$	0.15	(0.23)	−0.03	(0.19)
$(GROW_{\text{low-education males}})^2$	1.45	(0.53)	−1.71	(0.44)
$(GROW_{\text{low-education females}})^2$	−6.00	(1.23)	1.99	(1.02)
Adjusted R^2	0.94		0.95	
F and p -value	9.27	<0.0001	15.02	<0.0001

Notes: The standard errors are in parentheses. Each observation is a département-year. Observations are for the 95 French départements and for the years 1990–2000 (1,045 obs.). We construct the predicted employment growth rates in industries and within-industry growth of different demographic groups as described in Section 4.2. Each regression also includes socio-demographic controls (fraction of foreigners coming from North Africa, of other foreigners, fraction of those 15–24, of 25–49, of >50, of men living alone, of people in single-parent families, of unskilled people, of high school graduates, of those living in rural areas, of those living in cities with a population of between 20,000 and 200,000, in cities above 200,000, in Paris and suburbs), and time and département effects. Département population is used as weight.

Sources: Ministry of Interior, ANPE, INSEE (Labor Force Survey, 1990–2000).

TABLE 6A. IV effects of unemployment on crime (instruments: predicted employment growth, by age and département).

	Fraction of unemployed among 15–24-year-olds	Fraction of unemployed among 25–49-year-olds	Sargan statistics	p -value
Armed or violent robberies	19.71 (6.60)	−19.63 (8.85)	5.75	0.056
Burglaries	16.22 (4.85)	1.94 (6.51)	0.63	0.731
Car thefts	22.60 (6.74)	1.84 (9.04)	3.66	0.161
Motorbike thefts	21.76 (4.98)	−19.77 (6.68)	12.02	0.002
Thefts of objects from cars	16.26 (5.64)	3.57 (7.57)	2.72	0.257
Shoplifting	−0.66 (7.11)	5.83 (9.54)	5.02	0.081
Pickpocketing	20.29 (7.65)	−15.47 (10.26)	0.10	0.949
Receiving stolen goods	8.65 (8.01)	−5.61 (10.74)	0.52	0.770
Homicides, including attempts	−9.62 (9.94)	17.42 (13.33)	8.15	0.017
Voluntary wounds	1.82 (6.34)	24.01 (8.51)	8.57	0.014
Blackmails, threats	14.69 (7.06)	−16.03 (9.47)	4.91	0.086
Rape and other sex offenses	6.12 (5.48)	1.12 (7.35)	5.54	0.063
Family offenses, incl. violence against children	2.55 (3.99)	−11.09 (5.35)	0.42	0.811
Drug offenses	75.65 (14.83)	−41.77 (19.89)	4.60	0.100
Damage to vehicles	6.60 (6.90)	1.70 (9.26)	4.60	0.100
Illegal weapon ownership	16.05 (7.90)	−4.95 (10.59)	2.51	0.285
Violence against police	−25.90 (6.25)	20.44 (8.39)	10.76	0.005

Notes: The standard errors are in parentheses. Each observation is a département-year. Observations are for the 95 French départements and for the years 1990–2000 (1,045 obs.). Dependent variables are the logarithms of offenses' rates (offenses per 100,000 inhabitants). Instrumented variables are fraction of unemployed among those 15–24, or 25–49. Each regression also includes socio-demographic controls (fraction of foreigners coming from North Africa, of other foreigners, fraction of those 15–24, of 25–49, of >50, of men living alone, of people in single-parent families, of unskilled people, of high school graduates, of those living in rural areas, of those living in cities with a population of between 20,000 and 200,000, in cities above 200,000, in Paris and suburbs), and time and département effects. Département population is used as weight.

Sources: Ministry of Interior, ANPE, INSEE (Labor Force Survey, 1990–2000).

Instruments: predicted employment growth, by age and département, based on initial industry structure and aggregate industry growth (see Blanchard and Katz 1992).

TABLE 6B. IV effects of unemployment on crime (instruments: predicted employment growth, by education, sex and département).

	Fraction of unemployed among 15–24-year-olds	Fraction of unemployed among 25–49-year-olds	Sargan statistics	<i>p</i> -value
Armed or violent robberies	16.72 (5.54)	−4.92 (5.26)	1.36	0.507
Burglaries	35.04 (5.75)	−19.28 (5.47)	2.40	0.301
Car thefts	35.32 (6.65)	−14.30 (6.32)	0.21	0.901
Motorbike thefts	18.72 (3.90)	−13.73 (3.71)	13.90	0.001
Thefts of objects from cars	33.35 (6.08)	−13.68 (5.78)	2.30	0.317
Shoplifting	3.77 (6.08)	−5.22 (5.78)	2.30	0.317
Pickpocketing	27.74 (7.07)	−19.72 (6.72)	2.61	0.271
Receiving stolen goods	18.58 (7.10)	−12.66 (6.74)	1.88	0.390
Homicides, including attempts	3.86 (8.34)	6.28 (7.93)	22.36	0.000
Voluntary wounds	7.27 (4.32)	6.94 (4.11)	0.31	0.855
Blackmails, threats	−19.19 (6.45)	23.68 (6.13)	6.17	0.046
Rape and other sex offenses	2.44 (4.54)	1.27 (4.31)	1.78	0.411
Family offenses, incl. violence against children	−10.51 (3.40)	4.23 (3.23)	4.08	0.130
Drug offenses	73.48 (12.27)	−48.73 (11.66)	3.34	0.188
Damage to vehicles	20.67 (6.48)	−20.03 (6.16)	1.36	0.507
Illegal weapon ownership	−14.06 (7.08)	25.25 (6.73)	12.85	0.002
Violence against police	−38.53 (7.10)	41.81 (6.75)	1.36	0.507

Notes: The standard errors are in parentheses. Each observation is a département-year. Observations are for the 95 French départements and for the years 1990–2000 (1,045 obs.). Dependent variables are the logarithms of offenses' rates (offenses 100,000 people). Instrumented variables are fraction of unemployed among those 15–24, or 25–49. Each regression also includes socio-demographic controls (fraction of foreigners coming from North Africa, of other foreigners, fraction of those 15–24, of 25–49, of >50, of men living alone, of people in single-parent families, of unskilled people, of high school graduates, of those living in rural areas, of those living in cities with a population of between 20,000 and 200,000, in cities above 200,000, in Paris and suburbs), and time and département effects. Département population is used as weight.

Sources: Ministry of Interior, ANPE, INSEE (Labor Force Survey, 1990–2000).

Instruments: predicted employment growth, by education, sex and département, based on initial industry structure and aggregate industry growth (see Blanchard and Katz 1992).

have had less impact. To summarize, our first-stage results are quite satisfactory for our main variables of interest, the unemployment rates, when using predicted industry growth, by age or sex and education groups (with slightly larger *F*-statistics for instruments based on age).

Tables 6A and 6B present the IV results for our two sets of instruments. These tables have the same format as those previously discussed. Sargan's tests are reported in the last two columns. Most test statistics support the (statistical) quality of the instruments. In particular, the instruments are deemed satisfactory in all crimes but six: motorbike thefts, homicides for the two instruments, voluntary wounds, violence against police, blackmails, and illegal weapon ownership for one of the two. Hence, for only two crimes, our IV estimates are not statistically reliable. These IV results confirm previous estimates. Youth unemployment has a clear (positive) effect on most economic crimes: robberies, burglaries, car thefts,

thefts from cars, pickpocketing, drug offenses, and damage to vehicles. However it has a negative effect on four types of violent crimes, namely blackmails and threats, family offenses (including violence against children), illegal weapon ownership, and violence against the police.²⁰

The effects are often extremely large and significant. In order to assess their plausibility, let us take two contrasted examples: an département in eastern France, Bas-Rhin, where the fraction of unemployed among 15–24-year-olds is quite low (it varies from 0.04 to 0.08 over the period 1990–2000); and a département in southeastern France, Vaucluse, where this fraction is quite high (between 0.11 and 0.16 over the same period). Let us consider armed and violent robberies, for which the coefficient estimate is 19.71 (see Table 6A). This means that in Bas-Rhin, when the fraction of youth who are unemployed jumps from 0.04 to 0.08, our IV model predicts that the robbery rate will be multiplied by $\exp(0.04 \times 19.71) = 2.2$, in coherence with the magnitude of changes in armed and violent robberies rate in this département (varying between 83 and 221 robberies per 100,000 inhabitants). In Vaucluse, when the fraction of youth who are unemployed jumps from 0.11 to 0.16, our model predicts that this rate will be multiplied by $\exp(0.05 \times 19.71) = 2.7$, which seems also in line with the magnitude of changes in armed and violent robberies rate in this département (varying between 132 and 252 robberies per 100,000 inhabitants).

In addition, in unreported results (available again from the authors), it is only youth unemployment that positively affects crime; the fraction of students and the fraction of employed among the 15–24-year-olds having a statistically insignificant effect on crime (most often with negative signs, as expected). Therefore, the culprit is indeed youth unemployment which causes economic crimes. Finally, results in Table 6B (less so in Table 6A) show that the fraction of unemployed workers among the 25- to 49-year-olds has a strong negative, most often statistically significant, impact on crime (this variable is also instrumented, see Tables 5A and 5B). If criminals are mostly found among the young, their targets appear to be employed individuals. Hence, an increase in unemployment among the targets may cause a decrease in opportunities of profitable crime.

To summarize these last results, youth unemployment has a positive and robust causal effect on most property crimes—robberies, burglaries, car thefts—and on drug offenses when other types of violent crimes, such as rapes or homicides, appear to be unrelated to labor market conditions, in agreement with the Becker model of crime.

20. A referee pointed out that young people may be the victims of violent crime and can consequently reduce their exposure to crime by working. This argument could explain our last result. However we have no way to test for this assumption with our data.

5. Conclusion

In this paper, we studied the causal connection between youth unemployment and crime using a panel data set on 95 départements in France between 1990 and 2000. Beyond being the first such analysis for France, our main contributions are three-fold: (1) we used very precise measures of crimes; (2) we contrasted the shares of unemployed individuals among different age groups; and (3) we incorporated welfare payments into the analysis which appear to affect significantly individual incentives to commit crime.²¹

Our IV results suggest potential public policies against crime. Fighting youth unemployment should indeed help decreasing property crimes and drug offenses. However, some other economic or violent crimes appear to be unrelated to labor market conditions as measured by unemployment. We have also reported evidence that it is indeed unemployment among the young, and not the young *per se*, that causes crime. To attract the young away from crime, there are multiple potential routes. Education is an obvious one. More specifically, education has to pay, either directly or indirectly. For the direct component, two ideas can be mentioned. First, apprentices receive—by law—miserable compensation when doing their apprenticeship, which may explain that they are often used as cheap labor by firms without being effectively trained (see Fougére and Schwerdt 2002). Second, experiments in Israel show that large bonuses targeted to the poor that are paid when the child succeeds at school seem to work (see for instance Angrist and Lavy 2001). The indirect route is obviously longer investments in schooling with deferred compensations large enough to make the investment valuable. This is not an easy route in France where returns to a university education have decreased in the last 20 years (see Kramarz, Lemieux, and Margolis 2002).

Finally, we could wonder how our results might be specific to France, a country where youth unemployment is high, and where there are well-known social problems associated with a fraction of the youth population. Giving a precise answer to this question is somewhat difficult and beyond the scope of this paper. However, over the observed period (1990–2001), the youth unemployment rate varied significantly through space and time in France (see the examples given in Section 4.2). Thus, we believe that this variation makes our estimates quite meaningful beyond the French case.

21. Our results concerning the effects of UI benefits on crime rates are in the same line with those obtained by Machin and Marie (2006). These authors look at crime rates in areas of England and Wales before and after the introduction of a new, tougher unemployment benefit program—the Job Seekers Allowance (JSA)—in October 1996. They find that in the areas more affected by the tougher benefit regime crime rose by more. Areas that had more sanctioned individuals also experienced higher crime rates after the introduction of JSA. As such the benefit cuts and sanctions embodied in the JSA appear to have induced individuals previously on the margins to engage in crime.

Appendix A: Additional Empirical Results

TABLE A1. OLS effects of unemployment and unemployment benefits on crime, controlling for wages and inequalities.

	Fraction of unemployed among 15-24-year-olds	Fraction of unemployed among 25-49-year-olds	Fraction among unemployed above 25 not receiving UI	Fraction among unemployed above 25 not receiving UI	Median wage	Median wage	Ratio of third quartiles of the wage dist.	Adjusted R^2
Armed or violent robberies	4.18 (1.11)	-5.17 (1.47)	0.15 (0.11)	0.36 (0.26)	-0.18 (0.14)	(0.23)	0.95	
Burglaries	2.61 (0.60)	-1.85 (0.79)	0.14 (0.06)	0.08 (0.08)	-0.14 (0.14)	(0.12)	0.94	
Car thefts	1.05 (0.86)	0.23 (1.13)	0.10 (0.08)	-0.19 (0.08)	-0.29 (0.20)	(0.18)	0.95	
Motorbike thefts	3.45 (0.65)	-1.87 (0.86)	0.04 (0.06)	0.34 (0.08)	-0.23 (0.15)	(0.14)	0.92	
Thefts of objects from cars	2.44 (0.78)	-2.82 (1.04)	0.16 (0.08)	0.12 (0.13)	-0.03 (0.18)	(0.16)	0.91	
Shoplifting	-0.48 (1.33)	0.17 (1.76)	-0.20 (0.13)	-0.97 (0.31)	-0.43 (0.31)	(0.28)	0.73	
Pickpocketing	1.11 (1.29)	-0.30 (1.71)	0.19 (0.12)	0.10 (0.10)	-0.11 (0.30)	(0.27)	0.96	
Receiving stolen goods	5.06 (1.50)	-7.43 (1.98)	-0.15 (0.14)	0.21 (0.14)	0.02 (0.35)	(0.31)	0.70	
Homicides, including attempts	-2.03 (1.82)	2.04 (2.40)	0.47 (0.17)	0.03 (0.08)	0.06 (0.43)	(0.38)	0.64	
Voluntary wounds	1.59 (0.87)	-2.55 (1.14)	-0.07 (0.08)	-0.62 (0.20)	0.34 (0.20)	(0.18)	0.89	
Blackmails, threats	1.23 (1.22)	0.65 (1.61)	-0.25 (0.12)	-0.29 (0.29)	0.21 (0.23)	(0.25)	0.75	
Rape and other sex offenses	-1.66 (0.99)	4.88 (1.30)	0.15 (0.09)	-0.56 (0.23)	0.24 (0.20)	(0.20)	0.70	
Family offenses, including violence against children	-0.74 (0.67)	1.30 (0.89)	-0.01 (0.06)	-0.04 (0.06)	-0.06 (0.16)	(0.14)	0.86	
Drug offenses	6.70 (1.53)	-5.20 (2.01)	-0.14 (0.15)	-0.15 (0.36)	-0.05 (0.32)	(0.32)	0.78	
Damage to vehicles	1.19 (1.25)	-1.42 (1.66)	0.06 (0.12)	0.55 (0.29)	-0.19 (0.26)	(0.26)	0.86	
Illegal weapon ownership	0.85 (1.42)	-1.88 (1.87)	-0.02 (0.14)	-0.57 (0.33)	-0.25 (0.29)	(0.29)	0.79	
Violence against police	-3.30 (0.85)	0.36 (1.13)	-0.09 (0.08)	-0.64 (0.20)	-0.12 (0.18)	(0.18)	0.86	

Notes: The standard errors are in parentheses. Each observation is a département-year. Observations are for the 95 French départements and for the years 1990–2000 (1,045 obs.). Dependent variables are the logarithms of offenses' rates (offenses/100,000 people). Each regression also includes year and département fixed effects, socio-demographic controls (fraction of foreigners coming from North Africa, of other foreigners, fraction of those 15–24, of 25–49, of unemployed among those 50 and above, of men living alone, of people in single-parent families, of unskilled people, of high school graduates, of those living in rural areas, of those living in cities with a population between 20,000 and 200,000, in cities above 200,000, in Paris and suburbs). Département population is used as weight.

Sources: Ministry of Interior, ANPE, and INSEE (Labor Force Survey, 1990–2000).

TABLE A2. OLS effects of unemployment and unemployment benefits on crime, controlling for deterrence.

	Fraction of unemployed among 15-24-year-olds	Fraction of unemployed among 25-49-year-olds	Fraction among unemployed above 25 not receiving UI	Total police employment (in logs)	Total gendarmes employment (in logs)	Adjusted R ²
Armed or violent robberies	4.68 (1.12)	-5.78 (1.46)	0.12 (0.11)	-0.14 (0.08)	-0.64 (0.21)	0.95
Burglaries	2.17 (0.60)	-1.71 (0.78)	0.15 (0.06)	-0.12 (0.05)	0.41 (0.11)	0.94
Car thefts	0.80 (0.86)	0.15 (1.12)	0.10 (0.08)	-0.30 (0.07)	0.23 (0.16)	0.95
Motorbike thefts	3.33 (0.66)	-2.17 (0.86)	0.03 (0.06)	-0.22 (0.05)	0.00 (0.12)	0.93
Thefts of objects from cars	2.68 (0.79)	-3.11 (1.03)	0.15 (0.08)	-0.06 (0.06)	-0.28 (0.15)	0.91
Shoplifting	0.76 (1.34)	0.13 (1.74)	-0.20 (0.13)	0.09 (0.10)	-1.28 (0.25)	0.74
Pickpocketing	0.75 (1.31)	0.06 (1.71)	0.19 (0.12)	0.08 (0.10)	0.30 (0.24)	0.96
Receiving stolen goods	5.12 (1.52)	-7.59 (1.98)	-0.16 (0.14)	-0.02 (0.12)	-0.09 (0.28)	0.70
Homicides, including attempts	-0.85 (1.83)	1.57 (2.38)	0.44 (0.17)	0.22 (0.14)	-1.25 (0.34)	0.65
Voluntary wounds	1.83 (0.88)	-2.55 (1.15)	-0.06 (0.08)	0.05 (0.07)	-0.02 (0.16)	0.89
Blackmails, threats	1.86 (1.23)	0.22 (1.61)	-0.26 (0.12)	-0.03 (0.09)	-0.53 (0.23)	0.75
Rape and other sex offenses	-1.14 (1.00)	4.79 (1.30)	0.15 (0.09)	0.09 (0.08)	-0.37 (0.18)	0.70
Family offenses, including violence against children	-0.90 (0.68)	1.34 (0.88)	-0.01 (0.06)	-0.07 (0.05)	0.16 (0.13)	0.86
Drug offenses	5.43 (1.52)	-3.99 (1.98)	-0.10 (0.14)	0.19 (0.12)	1.33 (0.28)	0.78
Damage to vehicles	0.84 (1.27)	-1.50 (1.66)	0.05 (0.12)	-0.12 (0.10)	0.21 (0.24)	0.86
Illegal weapon ownership	2.39 (1.41)	-2.11 (1.84)	-0.04 (0.13)	0.26 (0.11)	-1.63 (0.26)	0.80
Violence against police	-2.42 (0.85)	0.53 (1.11)	-0.09 (0.08)	0.27 (0.06)	-0.87 (0.16)	0.87

Notes: The standard errors are in parentheses. Each observation is a département-year. Observations are for the 95 French départements and for the years 1990-2000 (1,045 obs.). Dependent variables are the logarithms of offenses' rates (offenses 100,000 people). Each regression also includes year and département fixed effects, socio-demographic controls (fraction of foreigners coming from North Africa, of other foreigners, fraction of those 15-24, of 25-49, of unemployed among those 50 and above, of men living alone, of people in single-parent families, of unskilled people, of high school graduates, of those living in rural areas, of those living in cities with a population of between 20,000 and 200,000, in cities above 200,000, in Paris and suburbs). Département population is used as weight.

Sources: Ministry of Interior, ANPE, and INSEE (Labor Force Survey, 1990-2000).

References

Angrist, Joshua D., and Victor Lavy (2001). "Does Teacher Training Affect Pupil Learning? Evidence from Matched Comparisons in Jerusalem Public Schools." *Journal of Labor Economics*, 19, 343–369.

Becker, Gary S. (1968). "Crime and Punishment: An Economic Approach." *Journal of Political Economy*, 76, 169–217.

Blanchard, Olivier, and Larry Katz (1992). "Regional Evolutions." *Brookings Papers on Economic Activity*, 1, 1–75.

Bogess, Scott, and John Bound (1993). "Did Criminal Activity Increase during the 1980s? Comparisons Across Data Sources." National Bureau of Economic Research Working Paper No. 4431.

Bowles, Samuel, and Arjun Jayadev (2006). "Guard Labor." *Journal of Development Economics*, 79(2), 328–348.

Cantor, David, and Kenneth C. Land (1985). "Unemployment and Crime Rates in the post-World-War II United States: A Theoretical and Empirical Analysis." *American Sociological Review*, 50, 317–323.

Card, David, Francis Kramarz, and Thomas Lemieux (1999). "Changes in the Relative Structure of Wages and Employment: A Comparison of the United States, Canada and France." *Canadian Journal of Economics*, 32(4), 843–877.

Chiricos, Theodore (1987). "Rates of Crime and Unemployment: An Analysis of Aggregate Research Evidence." *Social Problems*, 34, 187–211.

Cozzi, Marco (2005). "Black-White Labour Market Conditions and Property Crimes in the U.S.: A Quantitative Analysis." Working paper No. 339. *Computing in Economics and Finance 2005*, Society for Computational Economics.

Cullen, Julie Berry, and Steven D. Levitt (1996). "Crime, Urban Flight and the Consequences for Cities." National Bureau of Economic Research Working Paper No. 5737.

Entorf, Horst, and Hannes Spengler (2000). "Socio-economic and Demographic Factors of Crime in Germany: Evidence from Panel Data of the German States." *International Review of Law and Economics*, 20, 75–106.

Entorf, Horst, and Hannes Spengler (2002). *Crime in Europe: Causes and Consequences*. Springer.

Ehrlich, Issac (1973). "Participation in Illegitimate Activities: A Theoretical and Empirical Investigation." *Journal of Political Economy*, 81(3), 521–565.

Ehrlich, Issac (1996). "Crime, Punishment, and the Market for Offenses." *Journal of Economic Perspectives*, 10(1), 43–67.

Fajnzylber, Pablo, Daniel Lederman, and Norman Loayza (2002). "What Causes Violent Crime?" *European Economic Review*, 46, 1323–1357.

Fella, Giulio, and Giovanni Gallipoli (2007). "Education and Crime over the Life Cycle." Working Paper series 15-07, Rimini Centre for Economic Analysis.

Fougère, Denis, Francis Kramarz, and Julien Pouget (2006). "Youth Unemployment and Crime in France," IZA Discussion Paper No. 2009.

Fougère, Denis, and Wolfgang Schwerdt (2002). "Are Apprentices Productive?" *Konjunkturpolitik-Applied Economics Quarterly*, 48, 317–346.

Freeman, Richard B. (1983). "Crime and Unemployment." In *Crime and Public Policy*, edited by James Q. Wilson. Institute for Contemporary Studies Press.

Freeman, Richard B. (1994). "Crime and the Labor Market." In *Crime*, edited by James Q. Wilson and Joan Petersilia. Institute for Contemporary Studies Press.

Freeman, Richard B. (1996). "Why Do So Many Young American Men Commit Crimes and What Might We Do About It?" *Journal of Economic Perspectives*, 10(1), 25–42.

Freeman, Richard B. (1999). "The Economics of Crime." In *Handbook of Labor Economics*, Vol. 3C, edited by Orley Ashenfelter and David Card. North Holland Publishers.

Glaeser, Edward L., Bruce Sacerdote, and José A. Sheinkman (1996). "Crime and Social Interactions." *Quarterly Journal of Economics*, 111, 507–548.

Glaeser, Edward L., and Bruce Sacerdote (1999). "Why Is There More Crime in Cities?" *Journal of Political Economy*, 107, S225–S258.

Gould, Eric, Bruce Weinberg, and David B. Mustard (2002). "Crime Rates and Local Labor Market Opportunities in the United States: 1977–1997." *The Review of Economics and Statistics*, 84(1), 45–61.

Goux, Dominique, and Eric Maurin (2000). "The Decline in Demand for Unskilled Labour: An Empirical Method and its Application to France." *The Review of Economics and Statistics*, 82(4), 596–607.

Grogger, Jeffrey (1998). "Market Wages and Youth Crime." *Journal of Labor Economics*, 16(4), 756–791.

Grogger, Jeffrey (2000). "An Economic Model of Recent Trends in Violent Crime." In *The Crime Drop in America*, edited by Alfred Blumstein and Joel Wallman. Cambridge University Press.

Hale, Chris (1998). "Crime and the Business Cycle in Post-War Britain Revisited." *British Journal of Criminology*, 38(4), 681–698.

Imai, Susumu, and Kala Krishna (2004). "Employment, Dynamic Deterrence and Crime." *International Economic Review*, 45(3), 845–872.

Kelly, Morgan (2000). "Inequality and Crime." *The Review of Economics and Statistics*, 82(4), 530–539.

Kramarz, Francis, Thomas Lemieux, and David N. Margolis (2002), "Returns to Education in France and in the US." Working paper, CREST-INSEE.

Levitt, Steven D. (1997). "Using Electoral Cycles in Police Hiring to Estimate the Effect of Police on Crime." *American Economic Review*, 87(3), 270–290.

Lochner, Lance (2004). "Education, Work, and Crime: A Human Capital Approach." *International Economic Review*, 45(3), 811–843.

Lochner, Lance, and Enrico Moretti (2004). "The Effect of Education on Crime: Evidence from Prison Inmates, Arrests, and Self-Reports." *American Economic Review*, 94(1), 155–189.

Machin, Stephen, and Olivier Marie (2006). "Crime and Benefit Sanctions." *Portuguese Economic Journal*, 5(2), 149–165.

Machin, Stephen, and Costas Meghir (2004). "Crime and Economic Incentives." *Journal of Human Resources*, 39(4), 958–979.

Poutvaara, Panu, and Mikael Priks (2007). "Unemployment and Gang Crime: Could Prosperity Backfire?" IZA Discussion Paper No. 2710.

Roché, Sebastian (2001). *La Délinquance des jeunes: Les 13–19 ans racontent leurs délits*. Le Seuil.

Sampson, Robert J. (1987). "Urban Black Violence: The Effect of Male Joblessness and Family Disruption." *American Journal of Sociology*, 93, 348–382.

Thornberry, Terence, and R. L. Christenson. (1984). "Unemployment and Criminal Involvement: An Investigation of Reciprocal Causal Structures." *American Sociological Review*, 56, 609–627.

Willis, Michael (1997). "The Relationship between Crime and Jobs." Working paper, University of California-Santa Barbara.

Witte, Ann D., and Helen Tauchen (1994). "Work and Crime: An Exploration Using Panel Data." *Public Finance*, 49, 155–167.